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United States Department of Agriculture,

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SUGGESTIONS FOR THE COLLECTION OF RANGE PLANT SPECIMENS ON NATIONAL FORESTS.

The main object in collecting and preparing range plant specimens is to familiarize forest officers and permittees with the identity, forage value, and requirements of the plants which make up the forage crop on their respective Forests. This is essential in order to facilitate immediate application of data developed by investigations on stock-poisoning plants, seasons of grazing, adaptability of range to different classes of stock, and grazing management to secure natural revegetation.

During the four years since 1910 a greatly increased interest on the part of forest officers has been shown in the collection of range plant specimens. Approximately 23,000 have been submitted for identification during this period, representing over 3,000 species and 135 National Forests. While there has been a decided general improvement in the plant collections submitted, both in the specimens themselves and in the notes accompanying them, many collections are still received by the Washington office which show lack of proper care in the selection and pressing of the specimens, in the manner of their submission, and in the preparation of the notes.

SELECTION OF SPECIMENS.

The plants should be collected during their flowering or fruiting stage, and, wherever practicable, the whole plant should be collected. As the sheets for mounting the specimens are $11\frac{1}{2}$ by $16\frac{1}{2}$ inches, all specimens should come within these limits. If the plant is too large to be preserved in its normal position, it may be bent, preferably in A, N, or M shape, to bring it within the proper dimensions. It is often desirable, especially with grasses, to hold the corners securely, when bent and placed in the press, by means of small pieces of cardboard in each of which a slit about an inch or two long has been made. Grasses should not be bent at the "nodes" or joints.

A plant specimen, to be complete, should include not only representative portions of the parts above ground but also enough of the

underground parts to indicate clearly the character of the root system. It is often impossible to obtain all these parts in a single specimen, so two or more specimens should be collected when necessary, but when this is done care should be taken to see that these several portions are kept together in the collection and that they receive but one number, or preferably that they be placed in the same folder. Complete specimens are often necessary for certain identification, and are always desirable from the purely educational standpoint. Many Forest Service specimens have been unidentifiable specifically because, although in flower or in fruit, they lacked stem leaves, basal leaves, or roots. In this connection attention is called to the fact that many plants, including the great majority of sedges, rushes, borages, and umbellifers ("parsnips"), as well as a number of other plants, are unidentifiable, at least as to species, without mature fruits. Whenever practicable both flowering and fruiting specimens of leguminous plants, especially lupines and loco weeds, should be submitted. The identification of lupines and loco weeds is often difficult, and the presence of both flowers and pods is sometimes necessary for certain determination. Many others, for example *Ceanothus*, are unidentifiable without leaves, and a few, such as *Cicuta*, or poison hemlocks, are more or less dependent on roots for their certain determination.

In collecting specimens of trees and shrubs that are browsed the sprays selected should represent the common leaf and fruit forms. With tree specimens, small squares of the bark should be obtained whenever convenient; 2 to 4 inches square is sufficiently large.

METHOD OF DRYING.

The specimen should be placed between folded sheets of absorptive paper, such as the thin, white, containing sheets on requisition. The sheets containing the plants should then be piled alternately with sheets of blotting paper and placed between boards or a wicker press and subjected to a pressure of from 45 to 65 pounds; this is usually applied by tightly drawn straps or by a weight, not heavy enough to crush the tender parts of the green specimens yet not so light as to allow the leaves to wrinkle in drying. Stems, roots, and other parts more than a quarter of an inch in thickness should be thinned on the back with a knife before pressing. The blotters should be changed each day, substituting well-dried ones; in most cases, except perhaps fleshy or woody plants, the specimens will be thoroughly pressed and dried in about a week.

NUMBERING.

Each specimen collected in the field should be numbered, preferably on the outside of the lower left-hand corner of the containing sheet, in the order of collection. It is desirable that the collector

should not duplicate his numbers by beginning each season with No. 1, but should have his numbers continuous from year to year. Many Forest collections sent in for identification contain specimens of several collectors and in this way duplications of numbers often arise. Cases have occurred where the collectors' names were not given. The duplication of numbers arising, with the impossibility of distinguishing between them, renders a report on the collection, without the return of the specimens, valueless. To avoid all possible confusion, therefore, all joint collections sent in as one collection from a Forest should be given Forest numbers in addition to the collectors' numbers.

FORM 767.

Form 767, properly filled out, should accompany all range plant specimens submitted for identification. It may be pasted in the lower left-hand corner of the containing sheet or may be clipped on temporarily, subsequently to be pasted on the mounting sheet.

NOTES.

Notes on each specimen collected should be entered in a notebook labeled "Plant catalogue." The plant catalogue should contain as much of the following data as it is possible to collect, especially in the case of valuable and abundant plants:

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| 1. Collector's number. | 6. Dates when flower stalks are sent up. |
| 2. Botanical name. | 7. Dates when seeds mature, disseminate, and germinate. |
| 3. Common or local name. | 8. Seed habits—prolific or weak. |
| 4. Date of collection. | 9. Distribution and abundance. |
| 5. Locality. | 10. Palatability to various classes of stock and period grazed. |
| (a) Location and altitude. | 11. Any striking characteristics. |
| (b) Kind of soil. | 12. Remarks as to management. |
| (c) Moisture conditions. | |
| (d) Slope and exposure. | |
| (e) Forage type with its forage density. | |
| (f) Associated species. | |

The Washington office, in returning collections to the district, will furnish economic notes for each species. These notes, so far as possible, will cover the following points: Range, botanical description, habitat, periods of flowering and of seed dissemination, reproduction, and forage value. While every care will be taken to have these notes accurate and helpful, it is obviously impossible for any one man, or even group of men, in the Washington office, from personal observation or research, to know the habits and value of all the species comprising the forage crop of so vast a region as that covered by the National Forests. Such knowledge is necessarily cumulative and of long duration, the product of the observations of many men in many fields; its attainment will necessitate the cooperation of the entire

field force of the Service. All original data on forage plants which collectors may secure, other than that submitted with the specimens on Form 767, should be sent to the Washington office, preferably along with the specimens, for building up the economic notes. Such data are most convenient for reference when written on cards 4 by 6 inches, one card being reserved for each species. These cards are subject to requisition from the property clerk at Ogden, Utah.

IDENTIFICATION OF THE SPECIMENS.

All plants should be collected in triplicate or quadruplicate. Two sets should be forwarded to the district office, one set kept by the supervisor, and one set by the collector if desired.

The district office will retain one set for its own herbarium and forward the other, which should be complete, to the Forester. This collection will be retained for the Washington office herbarium.

The designations "G, Studies, Plant Identification, D-1" and "G, Studies, Plant Identification, Absaroka," should be used in all correspondence pertaining to range plant identification. The name of the Forest and the words "for Grazing" should be written on the outside of the package.

The identification of range plant specimens will be done by experts of the Bureau of Plant Industry; many of the plants, such as grasses, sedges, rushes, hawthorns, and willows, go to specialists in those groups.

MOUNTING FOR THE HERBARIUM.

The specimens are to be mounted by fastening them securely to white cardboard mounting sheets with narrow strips of adhesive tape, preferably surgeon's isinglass plaster (on silk). Many forms of surgeon's plaster are unsuited for this work, but the property clerk at Ogden now has material that is adequately adhesive. Thick and heavy mounts, such as woody specimens, may require the use of copper mounting wire to make them secure. Care should be taken to see that the ends of the specimens are rigid, and, in the case of twigs and stalks, which, unless properly mounted are easily pried off or broken in handling, the mounting plaster, which should go at right angles to the stem, should be so placed as to completely cover the ends of the specimen. Small, loose material, such as fruits, seeds, and leaves, which may be needed for further study, should be included with the specimen by inclosing such parts in a small envelope and pasting the latter, in such way as to be conveniently opened, in some corner of the mounting sheet.

Plant presses, drying blotters, white containing sheets, white cardboard mounting sheets (Form 430), and Form 767 can be obtained upon requisition from the property clerk at Ogden, Utah.

